

Improved Basic Locomotor Movements of Children through the Multiple Intelligence-Based Perceptual Motor Activity Model

Yudanto Yudanto

Sport Education, Universitas Negeri Yogyakarta, Indonesia

DOI: [10.31004/obsesi.v7i5.2601](https://doi.org/10.31004/obsesi.v7i5.2601)

Abstract

Kindergarten is a period of basic movement development. Basic locomotor movements are the basis of various skills that require training and guidance that will be able to develop in the child so that the child can perform well. This study aimed to determine the improvement of basic locomotor movements of kindergarten children through motor perception activities based on multiple intelligence. This research is pre-experimental research, with a one-group pre-test and post-test design. The subjects of this research were 2kindergarten's students. The research instrument used the Test of Gross Motor Development-2 (TGMD-2) from Ulrich (2000). Data analysis used the t-test, by comparing the average pre-test results with the average post-test results. The results of the research on basic locomotor movements, which include: run, gallop, hop, leap, horizontal jump, and slide, show the value of sig. $0.000 < 0.05$ and there was an increase in the post-test mean of each basic locomotor movement. The application of the model of perceptual motor activity based on multiple intelligences can improve basic locomotor movements, so kindergarten teachers can apply the model of perceptual motor activity based on multiple intelligences to improve basic locomotor movements.

Keywords: *perceptual motor activities; basic locomotor movements; kindergarten children*

Copyright (c) 2023 Yudanto Yudanto

✉ Corresponding author : Yudanto Yudanto

Email Address : email koresponden@gmail.com (alamat koresponden)

Received 7 April 2023, Accepted 7 August 2023, Published 25 October 2023

Introduction

Preschool is a period of comprehensive or holistic development. Developments that occur during this period include cognitive, physical motor, emotional, and psychosocial. Children at this time are also called the golden age. The period is a period of rapid growth and development in the brain (Affrida, 2017). Aspects of movement development that occur during preschool such as growth and physical development. Stimulation that leads to the growth and development of children is a major concern because optimal growth and development will have an impact on optimal brain, emotional, physical, and social development as well (Hidayatullah, 2019). Stimulation in preschool, especially in the development of basic movement skills in kindergarten children is needed. Basic movement skills at an early age are very important to learn. Children who are not taught enough about basic movements will experience various obstacles in learning and performing various movement skills that are more difficult later in life, such as learning sports technique skills later in life, (Bakhtiar, 2015). Preschool age and the early elementary school years are very important for the development and mastery of basic motor skills (Hardy et al., 2010). Basic locomotor movements can be

developed optimally by children when children have a strong perception that they can do well when doing exercises, (Mukherjee et al., 2011).

Basic movements are basic movements that develop in line with body growth and the level of maturity in children. Basic movement skills include locomotor, non-locomotor, and manipulative (Sugiyanto, 2005). Non-locomotor basic movements are movements that involve the feet or hands and the tool, which are movements without moving or pivoting on an axis in certain body parts, for example, turning the hands/arms, rotating the sticks, and swinging the legs/legs. Basic locomotor movements are movements that are accompanied by moving places, for example walking, running, jumping, and sliding. Manipulative basic motion is characterized by the presence of various movements or object manipulation. This movement involves the feet, hands or other body parts. The implementation of manipulative movements requires coordination or involves body parts with the senses of touch and sight when manipulating objects, for example playing with a ball using the hands or feet.

Stimulation of basic motor skills is needed because not all children experience normal movement development. The basic locomotor abilities possessed by children are essentially basic things that children must be able to do by their age development (Utari & Indahwati, 2015). However, some children still find it difficult to perform basic locomotor movements, which can cause delays in child development so that the child's movement will be very minimal. Basic locomotor movements can be said to develop if the child is skilled in using the coordination of body parts such as walking, walking, pedalling the legs and arms, jumping, and walking swerving to the right and left. In this case, the child will be more alert and flexible in socializing with friends around him. In addition, children who have the ability to good basic locomotor movements will be able to help show a good attitude and be skilled in solving problems experienced by these children in everyday life (Widiarti et al., 2021). Based on research by Rachman (2015), he has measured 109 kindergarten children to determine fine and gross motor skills. From 109 kindergarten children, gross motor skills were obtained, namely 19 children in the very good category, 55 children in the good category, 30 children in the moderate category, and 2 children in the poor category, (Rachman et al., 2019).

The basic locomotor movements possessed by older children are more satisfying than younger children, the difference is due to habituation or exercise that is done every day (Dourou et al., 2017). Basic locomotor movements can function properly when at an early age locomotor movements have experienced maturation because the maturation of basic locomotor movements at an early age can be a good provision to start the development of locomotor movements in adulthood (Melo, 2013). Based on this description, it is necessary to carry out further studies on the development of basic movements of preschool children by providing stimulation to help preschool children in achieving their movement development by the stage of movement development that should be. The provision of stimulation through motor perception activities given to preschool children during the developmental stage of preschool children needs to be done. This is also to the statement that basic locomotor movements can be developed optimally by children when children have a strong perception that they can do well when doing exercises, (Mukherjee et al., 2011).

Kindergarten childhood is also called the playing period. Activities that contain elements of perceptual-motor in the form of play are very important to kindergarten children. This is in accordance with several research results, including: 1) there is a relationship between academic ability and perceptual motor skills (Nourbakhsh, 2006), 2) spelling, reading, and math skills of children aged 4-6 years are influenced by motor perception in terms of kinesthetic, visual, and auditory (Dhingra et al., 2010), 3) cognitive skills of preschool children are influenced by programmed physical activity in a certain period (Hosseini et al., 2011), 4) achievement is influenced by perceptual motor, children have good cognitive if supported by good motor perception (Morales et al., 2011), 5) motor skills have a relationship with academic performance, in mathematics for grade 1 elementary school children (Macdonald et al., 2020), 6) motor perception has a relationship with basic movement skills in children aged 5-7 years

(Hyungmin & Johan, 2012), 7) perceptual motor program interventions for children aged 6-7 years are effective in improving gross and fine motor skills and the ability to read and spell (Botha & Africa, 2020), 8) perceptual motor training programs can develop agility, running, balance, coordination, and strength skills in children aged 8-11 years with high function autistic disorder (Azar & Akbar, 2018), 9) perceptual motor programs given to kindergarten children aged 4-6 years can improve gross and fine motor skills (Sajedi & Barati, 2014), 10) perceptual motor development can be developed optimally in children aged 3- 6 years (Johnstone & Ramon., 2011), 11) the involvement of perceptual motor elements in movement tasks, through a form of play, is very necessary for the teacher, to attract and make students happy (Ningrum & Sukoco, 2017), and 12) Perceptual Motor Training (PMT) has an influence on gross motor development aged 5-6 years. The increase in children's gross motor skills can be seen in children who can perform various kinds of locomotor movements, manipulative movements, and balance correctly and purposefully (Lukmawati et al., 2019).

The results of Yudanto's research (2018) have developed a model of perceptual-motor activity based on multiple intelligences for kindergarten children. This study resulted in a perceptual-motor activity model consisting of 8 (eight) theme-based games, namely: me-themed games, my family-themed games, my environment-themed games, animal-themed games, plant-themed games, vehicle-themed games, universe-themed games, and homeland themed game. The perceptual-motor activity model that has been developed requires a more in-depth study to determine the effect of basic movements, especially basic locomotor movements for kindergarten children. The purpose of this study was to determine the effect of the multiple intelligence-based perceptual-motor activity model on the basic locomotor movements of kindergarten children, which include: run, gallop, hop, leap, horizontal jump, and slide.

Methodology

This research is a quantitative descriptive study with an pre-experimental method. The research design used one group pre-test and post-test design. The research subjects were 25 children of class B kindergarten-aged 5-6 years, consisting of 10 girls and 15 boys at Pertiwi Plawikan Kindergarten, Klaten District. The treatment given was in the form of a perceptual motor-based physical activity model through theme-based games, which consisted of me-themed games, my family-themed games, my environment-themed games, themed games, plant-themed games, vehicle-themed games, universe-themed games, and land-themed games. my water, (Yudanto, 2018). This activity model is given for 30 days. The technique of collecting data is by observing the basic locomotor movements using an observation sheet. The research instrument used the Test of Gross Motor Development-2 (TGMD-2) (Ulrich, 2000). Research data in the form of the results of pre-test and post-test locomotor basic movements. In data analysis using the t-test, the average result of pre-test was compared with the average result of post-test. The research chart can be seen in Figure 1.

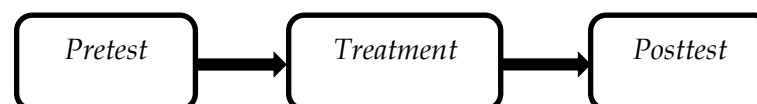


Figure 1. Research Desain

Result and Discussion

The results of data analysis will describe the results of pre-test and post-test of locomotor basic movements. The description of the data can be seen in table 1. Table 1 shows that each of the basic locomotor movements has increased after being given a model of perceptual motor activity based on multiple intelligences for 30 days. Each basic movement has increased above 30%.

Table 1. Descriptive Statistics of Locomotor Basic Movement Improvement

Component	n	Pre Test		Post Test		Percentage(%) Increase
		M	SD	M	SD	
Run	25	5.08	1.19	6.8	1.26	33.86
Gallop	25	5.32	1.11	7	1.19	31.58
Hop	25	5.48	1.23	7.44	0.92	35.77
Leap	25	3.52	1.23	4.96	1.17	40.91
Horizontal Jump	25	4.6	1.80	6.76	1.36	46.96
Slide	25	5.16	2.21	6.84	1.57	32.56

Table 2. Results of Kindergarten Manipulative Basic Movement Test

Component	Z	Asymp. Sig. (2-tailed)
Run	-4.427 ^b	0.000
Gallop	-.4562 ^b	0.000
Hop	-4.344 ^b	0.000
Leap	-4.512 ^b	0.000
Horizontal Jump	-4.417 ^b	0.000
Slide	-3.981 ^b	0.000

Table 2 shows the results of the t-test of all basic locomotor components with sig values. $0.000 < 0.05$, then there is a significant effect of the model of perceptual motor activity based on multiple intelligences on the basic locomotor movements of Kindergarten children. The results of this study indicate that the model of perceptual motor activity based on multiple intelligences has a significant effect on basic locomotor movements in kindergarten children. The basic locomotor movement abilities which include: run, gallop, hop, leap, horizontal jump, and slide have increased, as indicated by the post-test average being greater than the pre-test average. Run ability increased from 5.06 to 6.8 or an increased 33.86%, gallop ability increased from 5.32 to 7 or an increased 31.8%, hop ability increased from 5.48 to 7.44 or an increased 35.77%, jumping ability increased from 3.52 to 4.96 or increased by 40.91%, horizontal jump ability increased from 4.6 to 6.76 or increased 46.96%, and slide ability increased from 5.16 to 6.84 or an increase of 32.56%.

The results of the research that has been carried out, by applying a model of perceptual motor activity based on multiple intelligences can increase basic locomotor movements. The results of this study are relevant to the results of research by Ningrum and Sukoco 2017, which state that providing a perceptual motor activity program can improve basic locomotor movement skills. Preschool age is an important period in the development and perfection of basic movements. In general, children who grow normally can learn and develop complex movements. Preschool age and early elementary school years are very important for the development and mastery of basic motor skills (Hardy et al., 2010). Efforts in developing basic abilities, to obtain development that is influenced by the development of nerves and muscles. This is to one of the principles of motor development, namely motor development depending on the maturity of muscles and nerves (Sukamti, 2018). The wealth of movements possessed by children and movements that describe a movement pattern also affect the development of basic movements.

Efforts to develop basic movement skills in kindergarten children can be done through various forms of perceptual motor-based physical activity. Physical activity models based on motor perception influence the basic movement abilities of kindergarten children. The results of previous research on perceptual-motor state that perceptual-motor has a relationship with basic motor skills in children aged 5-7 years. The basic movements measured include: Seven skills comprise the locomotor subtest (run, gallop, hop, leap, jump, skip, and slide), with five skills for the object control subtest (two hand strike, stationary bounce, catch, kick, and

overhand throw), (Hyungmin & Johan, 2012). Interventions with motor perception programs in children aged 6-7 years are effective in improving motor skills gross and fine as well as reading and spelling skills (Botha & Africa, 2020). Perceptual motor training programs can develop agility, running, balance, coordination and strength skills in children aged 8-11 years with high function autistic disorder (Azar & Akbar, 2018). Perceptual motor programs given to kindergarten children aged 4-6 years can improve gross and fine motor skills (Sajedi & Barati, 2014). Perceptual-motor development can develop optimally in children aged 3-6 years (Johnstone & Ramon., 2011). Involving the elements of motor perception in the task of movement, through a form of the game is very necessary for teachers, in order to be able to attract and make students happy, (Ningrum & Sukoco, 2017). Perceptual Motor Training (PMT) has an influence on gross motor development aged 5-6 years. The increase in children's gross motor skills can be seen in children who can perform various kinds of locomotor movements, manipulative movements, and balance correctly and directed (Lukmawati et al., 2019).

According to some opinions, experts state that early childhood is a critical period for the development of basic movement abilities. The basic movement ability possessed depends on several internal and external factors, such as biological, psychological, social, motivational, cognitive, and others. The intervention of basic movement skills in preschool affects the mastery of basic movements in elementary school (Aryamanesh & Sayyah, 2014). Basic movement skills at preschool age are required in the involvement of structured and unstructured physical activity. Basic motor skills training from an early age plays an important role and describes a child's physical, social, and cognitive development (Giannakidou et al., 2014). The basic ability has a significant relationship with daily physical activity (Fisher et al., 2005). The development of children's basic movements plays an important role in cognitive, physical and social development, and builds the foundation for an active lifestyle (Hands & McIntyre, 2015). The results of the research by Ivonne et al. concluded that the daily activities of preschool children are influenced by basic abilities (Iivonen et al., 2013). An ideal opportunity for children to learn to develop muscle control and movement from an early age. Early childhood still likes movements in simple forms such as jumping, running, throwing, and kicking (Nurtajudin, 2015). Children are aged 3-6 years can be considered a period of learning skills and developing gross and fine skills, (Sujarwo, 2015). Kindergarten children naturally like to explore movement and their daily activities are dominated by movement activities, they need to be given experience and basic movement skills through physical activity (Hartono et al., 2003). Basic motion physical activity in childhood which includes childhood, locomotor, and manipulative movements given the game will be fun (Rumini, 2014). Stimulation to develop basic movements plays a role in the formation of children's talents. In the preschool period, children need to be given multilateral activities that develop all physical aspects (Sumantri, 2015). Various kinds of gross motor skills in children provide an important role in physical activity in their lives (Komputerisna, 2016). The growth and development of children are influenced by their coveted motor skills. Delayed motor skills will have an impact on stunted growth and development as well (Fajar & Permana, 2013). The results of the study (Smith, 2016) show that children need to master basic movement skills before learning basic skills in a game. Mastery of basic movement patterns will be very beneficial when learning complex movements. The basic motion is the foundation for the smoothing and appearance stage so that you will get good motion quality (Sutapa, 2002).

The results showed that there was an increase in the basic locomotor run, gallop, hop, leap, horizontal jump, and slide movement. Implementation of the model of motor perceptual activity based on multiple intelligences is proven to improve basic locomotor movements. The advantages of the model of motor perceptual activity based on multiple intelligences, because it includes: 1) non-locomotor basic movements that are stimulated in the perceptual motor-based physical activity model include pulling, twisting, and bending; 2) basic locomotor movements that are stimulated in motor perception-based physical activity models include

running, walking, monitoring, jumping, and cranking; 3) manipulative basic movements that are stimulated in perception-based physical activity models include throwing, catching, bouncing, hitting, and kicking, and 4) the model of motor perceptual activity based on multiple intelligences, it integrates elements of multiple intelligences, such as: verbal-linguistic intelligence, logical-mathematical intelligence, visual-spatial intelligence, musical intelligence, kinesthetic intelligence, interpersonal intelligence, intrapersonal intelligence, naturalist intelligence, and existential intelligence. The limitation of this study is that the researcher cannot monitor the activities carried out by students outside of school and the model of perceptual motor activity based on multiple intelligences only for kindergarten children in group B.

Conclusion

Early childhood is the most appropriate time to develop perceptual motor and basic movements. This study shows that giving a model of perceptual motor activity based on multiple intelligences can improve the basic locomotor movements of kindergarten children. The basic movement abilities of the run, gallop, hop, leap, horizontal jump, and slide, have increased. Therefore, it is hoped that teachers and parents can apply the model of perceptual motor activity based on multiple intelligences, as an alternative to improve the basic locomotor movements of kindergarten children.

Acknowledgement

The author would like to thank teachers and students at Pertiwi Plawikan Kindergarten, Jogonalan, Klaten.

References

- Affrida, E. N. (2017). Strategi Ibu dengan Peran Ganda dalam Membentuk Kemandirian Anak Usia Pra Sekolah. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 1(2), 114. <https://doi.org/10.31004/obsesi.v1i2.24>
- Aryamanesh, S., & Sayyah, M. (2014). Effect of some selected games on the development of locomotor skills in 4-6 year-old preschool boys. *International Journal of Sport Studies*, 4(6), 648-652. <https://journal.uny.ac.id/index.php/jolahraga/article/view/6262https://journal.uny.ac.id/index.php/jolahraga/article/view/6262>
- Azar, F. O., & Akbar, P. S. (2018). The Effect of Perceptual- Motor Training on Children ' s Development Motor Skills Aged Between 8 to 11 with High Function Autistic Disorder (HFA). *Indonesian Journal of Applied Science in Physical Education*, 2(2), 1-11. <https://journal.uny.ac.id/index.php/jolahraga/article/view/30968>
- Bakhtiar, S. (2015). *Merancang Pembelajaran Gerak Dasar Anak*. UNP Press.
- Botha, S., & Africa, E. K. (2020). The Effect of a Perceptual-Motor Intervention on the Relationship Between Motor Proficiency and Letter Knowledge. *Early Childhood Education Journal*, 0123456789. <https://doi.org/10.1007/s10643-020-01034-8>
- Dhingra, R., Manhas, S., & Kohli, N. (2010). Relationship of Perceptual Abilities with Academic Performance of Children. *Journal of Social Sciences*, 23(2), 143-147. <https://doi.org/10.1080/09718923.2010.11892823>
- Dourou, E., Komessariou, A., Riga, V., & Lavidas, K. (2017). Assessment of gross and fine motor skills in preschool children using the Peabody Developmental Motor Scales Instrument. *European Psychomotricity Journal*, 9(1), 89-113. <https://psychomotor.gr/assessment-of-gross-and-fine-motor-skills-in-preschool-children-using-the-peabody-developmental-motor-scales-instrument>
- Fajar, D., & Permana, W. (2013). Perkembangan Keseimbangan pada Anak Usia 7 s/d 12 Tahun Ditinjau dari Jenis Kelamin. *Jurnal Media Ilmu Keolahragaan Indonesia*, 3(1). <https://doi.org/10.15294/miki.v3i1.2657>

- Fisher, A., Reilly, J. J., Kelly, L. A., Montgomery, C., Williamson, A., Paton, J. Y., & Grant, S. (2005). Fundamental movement skills and habitual physical activity in young children. *Medicine and Science in Sports and Exercise*, 37(4), 684–688. <https://doi.org/10.1249/01.MSS.0000159138.48107.7D>
- Giannakidou, D., Nastou, K., Karanatsiou, F., Pavlidou, S., & Kambas, A. (2014). A review of the relationship between physical activity and motor proficiency in children. *European Psychomotricity Journal*, 6(1), 52–59. <https://doi.org/10.1016/j.langcom.2014.12.002>
- Hands, B., & McIntyre, F. (2015). Assessment of fundamental movement skills in Australian children: the validation of a Fundamental Motor Skills Quotient (FMSQ). *Malaysian Journal of Sport Science and Recreation*, 11(1), 1–12.
- Hardy, L. L., King, L., Farrell, L., Macniven, R., & Howlett, S. (2010). Fundamental movement skills among Australian preschool children. *Journal of Science and Medicine in Sport*, 13(5), 503–508. <https://doi.org/10.1016/j.jsams.2009.05.010>
- Hartono, M., Rahayu, T., & Rustiadi, T. (2003). Model Belajar Gerak di Kanak-Kanak. *Jurnal Nasional Pendidikan Jasmani Dan Ilmu Keolahragaan (National Journal of Physical Education and Sport Science)*, 2 (1). <https://ojs.unpkediri.ac.id/index.php/pjk/article/view/13976>
- Hidayatullah, M. F. (2019). *Aktivitas Gerak pada masa Kanak-Kanak*. Cakra Wijaya Press.
- Hosseini, S. S., Panahi, M., Naghilo, Z., & Ramandi, L. D. (2011). The Effect of Exercise Training on Perceptual Motor Skills and Physical Fitness Factors in Preschool Children. *Middle-East Journal of Scientific Research*, 9(6), 764–768. [https://idosi.org/mejsr/mejsr9\(6\)11/11.pdf](https://idosi.org/mejsr/mejsr9(6)11/11.pdf)
- Hyungmin, P., & Johan, S. (2012). The relation between basic movement skills and perceptual-motor skills in 5 to 7 years old children. *European Journal of Neuroscience*, 4(1), 57–65. <https://psychomotor.gr/the-relation-between-basic-movement-skills-and-perceptual-motor-skills-in-5-to-7-years-old-children>
- Iivonen, K. S., Sääkslahti, A. K., Mehtälä, A., Villberg, J. J., Tammelin, T. H., Kulmala, J. S., & Poskiparta, M. (2013). Relationship between fundamental motor skills and physical activity in 4-year-old preschool children. *Perceptual and Motor Skills*, 117(2), 627–646. <https://doi.org/10.2466/10.06.PMS.117x22z7>
- Johnstone, J. A., & Ramon, M. (2011). *Perceptual-motor activities for children : an evidence-based guide to building physical and cognitive skills* (USA). Human Kinetic.
- Komputerisna, A. A. (2016). Gross Motor Skills of The Childrenâs Group A Judging From Demonstration Method of Motion and Song in Kindergarten Pertiwi Nusa Indah. *BELIA: Early Childhood Education Papers*, 5(1), 1–5. <https://journal.unnes.ac.id/sju/index.php/belia/article/view/10839>
- Lukmawati, L., Sriyanto, M. I., & Syamsuddin, M. M. (2019). Pengaruh Perceptual Motor Training (Pmt) Terhadap Perkembangan Motorik Kasar Pada Anak Usia 5-6 Tahun. *Kumara Cendekia*, 7(2), 175. <https://doi.org/10.20961/kc.v7i2.36386>
- Macdonald, K., Milne, N., Orr, R., & Pope, R. (2020). Associations between motor proficiency and academic performance in mathematics and reading in year 1 school children: A cross-sectional study. *BMC Pediatrics*, 20(1), 1–11. <https://doi.org/10.1186/s12887-020-1967-8>
- Morales, J., Gonzales, L. M., Guerra, M., Virgili, C., & Unnithan, V. (2011). Physical Activity, Perceptual Motor Performance, and Academic Learning in 9 to 16 Years Old School Children. *International Journal of Sport Psychology*, 42: 401–41. <https://psycnet.apa.org/record/2011-19374-005>
- Mukherjee, M., Siu, K. C., Katsavelis, D., Fayad, P., & Stergiou, N. (2011). The influence of visual perception of self-motion on locomotor adaptation to unilateral limb loading. *Journal of Motor Behavior*, 43(2), 101–111. <https://doi.org/10.1080/00222895.2010.548420>
- Ningrum, N. F. M., & Sukoco, P. (2017). Pengembangan model permainan untuk

- meningkatkan perseptual motorik dan perilaku sosial siswa sekolah dasar kelas bawah. *Jurnal Keolahragaan*, 5(2), 171. <https://doi.org/10.21831/jk.v5i2.7905>
- Nourbakhsh, P. (2006). Perceptual-motor abilities and their relationships with academic performance of fifth grade pupils in comparison with Oseretsky Scale. *Kinesiology*, 38(1), 40–48. <http://connection.ebscohost.com/c/articles/21557865/perceptual-motor-abilities-their-relationships-academic-performance-fifth-grade-pupils-comparison-oseretsky-scale>
- Nurtajudin. (2015). Pengaruh Latihan Koordinasi Mata-Kaki-Tangan Dan Tingkat Keseimbanganterhadap Motorik Kasar Anak Usia Dini. *Journal of Physical Education and Sports*, 4(2), 154–158. <https://journal.unnes.ac.id/sju/index.php/jpes/article/view/9885>
- Rachman, H. A., Yudianto, Sujarwo, & Sudardiyono. (2019). Intervention Model of Perceptual Motor Development in Preschool Children Movement Development. *YISHPESS*, 278, 61–65. <https://doi.org/10.2991/yishpess-cois-18.2018.15>
- Rumini. (2014). Pembelajaran Permainan Kids' Athletics sebagai Wujud Pengembangan Gerak Dasar Atletik pada Anak-Anak. *Journal of Physical Education, Health and Sport*, 1 (2). <https://journal.unnes.ac.id/nju/index.php/jpehs/article/view/3208>
- Sajedi, F., & Barati, H. (2014). The effect of perceptual motor training on motor skills of preschool children. *Iranian Rehabilitation Journal*, 12(19), 14–17. https://applications.emro.who.int/imemrf/Iran_Rehabil_I/Iran_Rehabil_I_2014_12_19_14_17.pdf
- Smith, W. (2016). Fundamental movement skills and fundamental games skills are complementary pairs and should be taught in complementary ways at all stages of skill development. *Sport, Education and Society*, 21(3), 431–442. <https://doi.org/10.1080/13573322.2014.927757>
- Sugiyanto. (2005). *Perkembangan dan Belajar Motorik*. Universitas Terbuka.
- Sujarwo. (2015). Kemampuan Motorik Kasar dan Halus Anak Usia 4-6 Tahun. *Jurnal Pendidikan Jasmani Indonesia*, 11(2), 96–100. <https://doi.org/10.21831>
- Sukamti, E. R. (2018). *Perkembangan Motorik*. UNY Press.
- Sumantri, M. S. (2015). Learning Model of Fundamental Long Jump Movement Based On Game Approach. *Indonesian Journal of Early Childhood Education Studies*, 4(1), 35–41. <https://doi.org/10.15294/ijeces.v4i1.9451>
- Sutapa, P. (2002). Pengamatan Pola Perkembangan Motorik Anak Sebagai Langkah Awal Pemninaan Calon Olahragawan. *Majalah Olahraga*, 8 (1).
- Ulrich, D. A. (2000). *Test of Gross Motor Development -2 (2nd ed.)*. Pro-ed.
- Utari, Y. I., & Indahwati, N. (2015). Upaya Meningkatkan Gerak Dasar Lokomotor Anak Tunagrahita Ringan Melalui Permainan Tradisional (Pada Siswa- Siswi Sekolah Dasar Luar Biasa Tunas Mulya Surabaya). *Jurnal Pendidikan Olahraga Dan Kesehatan*, 3(2), 279–282. <https://ejournal.unesa.ac.id/index.php/jurnal-pendidikan-jasmani/article/view/13528/12424>
- Widiarti, W., Yetti, E., & Siregar, N. (2021). Peningkatan Kemampuan Gerak Dasar Lokomotor Anak melalui Modifikasi Seni Tradisional Burok. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, 5(2), 1787–1798. <https://doi.org/10.31004/obsesi.v5i2.1005>
- Yudianto. (2018). *Model Aktivitas Jasmani Berbasis Perseptual Motorik untuk Mengembangkan Multiple Intelligences bagi Peserta Didik Taman Kanak-Kanak*. Universitas Negeri Semarang.